Yellow Fever
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Yellow Fever

Overview [1,2]

For a complete description of yellow fever, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

NOTE: Yellow fever is a potential bioterrorism weapon. **If the case has no remarkable travel history, a bioterrorism event should be considered.** If you suspect that you are dealing with a bioterrorism situation, contact your Regional Communicable Disease Coordinator immediately.

Case Definition [3]

Clinical description

A mosquito-borne viral illness characterized by acute onset and constitutional symptoms followed by a brief remission and a recurrence of fever, hepatitis, albuminuria, and in some instances, renal failure, shock, and generalized hemorrhages.

Laboratory criteria for diagnosis

- Fourfold or greater rise in yellow fever antibody titer in a patient who has no history of recent yellow fever vaccination and cross-reactions to other flaviviruses have been excluded, or
- Demonstration of yellow fever virus, antigen, or genome in tissue, blood, or other body fluid.

Case classification

Confirmed: a clinically compatible case that is laboratory confirmed.
Probable: a clinically compatible case with supportive serology (stable elevated antibody titer to yellow fever virus [e.g., ≥32 by complement fixation, ≥256 by immunofluorescence assay, ≥320 by hemagglutination inhibition, ≥160 by neutralization, or a positive serologic result by immunoglobulin M-capture enzyme immunoassay]. Cross-reactive serologic reactions to other flaviviruses must be excluded, and the patient must not have a history of yellow fever vaccination.)

Information Needed for Investigation

- **Verify the diagnosis**. What laboratory tests were conducted and what were the results?

- **Determine if the case had a history of recent foreign travel**.
- **Contact the Regional Communicable Disease Coordinator** immediately if the case has no remarkable travel history, or in-state exposure is suspected.

Case/Contact Follow Up And Control Measures

Determine the source of infection.

- Elicit history of travel to an endemic area.
- Identify other potential cases.

Control Measures

See the Control of Communicable Diseases Manual, Yellow Fever, "Methods of control."

See the Red Book, Arboviruses (including Yellow Fever), "Control Measures."

Laboratory Procedures

Yellow fever testing is not routinely offered by the Missouri State Public Health Laboratory (SPHL), as special arrangements must be made for testing. Information on laboratory procedures can be obtained from the Regional Communicable Disease Coordinator or from staff at the SPHL. The SPHL web site is: http://www.dhss.state.mo.us/Lab/index.htm. (16 May 2003)

Specimens:

Specific diagnosis depends on isolation of virus from blood, demonstration of viral antigen in serum by enzyme-linked immunosorbent assay (ELISA), or identification of viral RNA by polymerase chain reaction (PCR) during the period of infection.

Serologic diagnosis is achieved by IgM antibody-capture ELISA, hemagglutination inhibition (HI), complement fixation (CF), or neutralization (N) tests. IgM, HI, and N antibodies appear within 5-7 days and CF antibodies within 7-14 days after onset. Paired acute and convalescent sera should be tested, and rising antibody titers provide confirmation of the diagnosis. Cross-reacting antibodies to other flaviviruses often complicate serologic diagnosis. Because IgM and CF antibodies persist for relatively short periods of time, they provide a marker of recent infection. IgM antibodies wane or disappear after weeks or months, and CF antibodies wane after 1-2 months to low levels by about a year after recovery from infection. A retrospective diagnosis may be achieved by demonstrating a fall in IgM or CF titers in appropriately timed serum specimens. Pathologic examination of the liver provides a postmortem diagnosis; liver biopsy is absolutely contraindicated, however, because of the bleeding diathesis, and deaths have resulted from this procedure. Yellow fever antigen may be demonstrated in formalin fixed tissues of liver, kidney, and heart by immunocytochemical staining. [4]

Reporting Requirements

Yellow fever is a Category I(B) reportable disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (DHSS) within 24 hours of first knowledge or suspicion by telephone, facsimile or other rapid communication.

1. For all cases, complete a "Disease Case Report" (CD-1).
2. For confirmed and probable cases, complete a "Record of Investigation of Communicable Disease" (CD-2).
3. Entry of the completed CD-1 into MOHSIS negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
4. Send the completed secondary investigation form to the Regional Health Office.
5. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
6. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

References

1. Chin, James, ed. "Yellow Fever." Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 553-558.
2. American Academy of Pediatrics. "Arboviruses (including Yellow Fever)." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 170-175.
3. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997; 46 (No.RR-10). "Yellow Fever," 1997, http://www.cdc.gov/epo/dphsi/casedef/yellow_fever_current.htm (16 May 2003)
4. Monath, Thomas P. "Flaviviruses (Yellow Fever, Dengue, Dengue Hemorrhagic Fever, Japanese Encephalitis, St. Louis Encephalitis, Tick-borne Encephalitis)." Principles and Practice of Infectious Diseases. 4th ed. Eds. Gerald L Mandell, John E. Bennett, and Raphael Dolin. New York: Churchill Livingstone, 1995: 1948-1956.

Other Sources of Information

1. Shope, Robert E., and Meegan, James M. "Arboviruses." Viral Infections of Humans Epidemiology and Control. 4th ed. Alfred S. Evans and Richard A. Kaslow. New York: Plenum, 1998: pages 151-183.
2. The Merck Veterinary Manual. 8th Ed. Ed. Susan E. Aiello. Whitehouse Station, NJ: Merck & Co., Inc., 1998: 2184. http://www.merckvetmanual.com/mvm/index.jsp (search "yellow fever"). (16 May 2003)

Web Resources and Information

1. Centers for Disease Control and Prevention, "Yellow Fever," http://www.cdc.gov/ncidod/dvbid/yellowf.htm (16 May 2003)
2. Karolinska Institutet – "Virus Diseases," http://www.mic.ki.se/Diseases/c2.html (16 May 2003)

Yellow Fever

FACT SHEET

What is yellow fever?

Yellow fever is an acute infectious disease caused by a virus. The female mosquito of *Aedes aegypti* spreads the disease. The disease occurs in tropical and subtropical areas of the world. Yellow fever is not present in the United States.

Who gets yellow fever?

All people who live in or visit areas where yellow fever is present are at risk, unless they have been properly vaccinated or had the disease.

How is yellow fever spread?

Aedes mosquitoes transmit yellow fever from person to person, and sometimes from monkeys and other animals to humans.

What are the symptoms of yellow fever?

Symptoms of yellow fever range from mild to severe, and death occurs in about five percent of cases. Initial symptoms may include fever, chills, headache, back pain, general muscle aches, nausea, and vomiting. Jaundice (yellowing of the eyes and skin) usually develops and may progress during the disease. Hemorrhaging (nosebleeds, gum bleeding, blood in vomitus and stool), kidney, and/or liver failure can occur in severe cases.

How soon after infection does symptoms appear?

Symptoms generally appear three to six days after exposure.

Does past infection make a person immune?

Yes. People who have had yellow fever develop lifelong immunity.

How is yellow fever diagnosed?

Yellow fever is diagnosed by isolating the virus from blood or by a positive antibody test.

What is the treatment for yellow fever?

Since yellow fever is caused by a virus and antibiotics are not effective against viruses, there is no specific treatment for yellow fever.

How can yellow fever be prevented?

Since transmission of yellow fever no longer occurs in the United States, it is important for travelers to be immunized before visiting areas where yellow fever exists. Travelers should also take measures to avoid being bitten by mosquitoes.

Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113

MISSOURI DEPARTMENT OF HEALTH

RECORD OF INVESTIGATION OF COMMUNICABLE DISEASE*

FOR CODING ONLY

County		City	
Twnshp.		Disease	
Hospital			Source
Physician			

Patient's Name

Address | City | State | Zip Code

Birth / / | Sex ☐ M ☐ F | Race ☐ W ☐ N ☐ Other | County of Residence

Parent's Name If Not Adult | Phone

Hospitalized ☐ Yes ☐ No | Hospital Name | Date of Onset

Physician's Name | Phone Number

Address | Date

Previous Address (if significant) | Date Moved

Place Employed or School Attended | Occupation

Date Reported | How did you first learn of this case? | Date

Disease _____ ☐ Confirmed ☐ Suspected or } at beginning of investigation.

Chief Clinical Symptoms with Dates: _____

Treatment (type, amount, dates): _____

DIAGNOSTIC LABORATORY TESTS ON PATIENT

Type of Specimen	Date Collected	Result	Name of Laboratory

Are there other associated cases? _____ If yes, how many, and how associated? _____

Household Sanitation: ☐ Good ☐ Fair ☐ Poor

Milk Supply _____

Water Supply _____

(Continued on reverse side)

* Special forms should be used for investigations of Diphtheria (CD 2A), Encephalitis or Meningitis (CD 2B), Enteric Infections (CD 2C) and Foodborne Outbreaks (CD 2D).

Other Pertinent Epidemiological Data (exposure to birds and animals, insect bites, vaccination, travel, etc.): _____

CONTACTS (Household and Other)

Name and Address	Age / Sex	Relation to Patient	Similar Illness? Onset Date	Laboratory Specimen	Date Collected	Result

Narrative and Follow-up Notes: _____

Probable Source _____

☐ Recovered ☐ Died Date of Death _____ Cause of Death _____

Investigated by _____ Final Diagnosis _____

Name of Agency _____ Date _____